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Recent Changes to the Safety Measurement System (SMS) Methodology

The Federal Motor Carrier Safety Administration (FMCSA) is committed to reducing fatalities on our Nation's highways. Major pieces of FMCSA's new field-tested Operational Model, CSA 2010, will be in place this year, to make roads safer. Designed to save lives, the Operational Model includes a new Safety Measurement System (SMS) that introduces a better way to measure carrier safety, and has been created through a process of development, testing, adjustment, and re-testing.

Essential to the development of FMCSA's next-generation approach to safety was the conduct of an extensive, 30-month, Operational Model test of the new program. Preliminary results demonstrated positive gains in efficiency that will allow the Agency and state law enforcement officials to reach more carriers earlier, leading to improvements in compliance, safety, and accountability.

FMCSA and its stakeholders share a commitment to safety, which has been underscored by strong participation in FMCSA's listening sessions on CSA 2010 resulting in constructive input from organizations, enforcement personnel, industry, and motor carrier safety experts. During the Operational Model test period, FMCSA solicited feedback and suggestions from stakeholders including FMCSA staff, state partners, industry, and safety advocates and, as a result, the Agency has identified four opportunities to enhance the new program. The enhancements include:

1. Modifications to the measure of exposure for the Unsafe Driving BASIC and Crash Indicator;
2. Refinements to the measurement approach for the Controlled Substances/Alcohol BASIC;
3. Updates to the severity weights of roadside violations based on subject matter expert (SME) review; and
4. A more strategic approach to addressing motor carriers with a history of vehicle size and weight violations.

Below is detailed information regarding the feedback, analysis, and implementation approach for each of these four enhancements. More specific information on the entire SMS methodology can be found in the methodology document at http://csa2010.fmcsa.dot.gov/Documents/SMSMethodology.pdf.

1. Modifications to the measure of exposure for the Unsafe Driving BASIC and Crash Indicator

a. *Feedback*: The sole use of number of Power Units (PUs) owned by a motor carrier underestimates the on-road exposure for carriers that more extensively utilize their PUs. The use of Vehicle Miles Traveled (VMT) should be considered as a means of assessing the Unsafe Driving BASIC and Crash Indicator that currently rely on PUs.

b. *Analysis Conducted*: Analysis conducted by FMCSA shows that, while measuring exposure solely by PUs may overly identify high-utilization carriers (i.e., carriers with above-average VMT per PU) as deficient, the sole use of VMT overly identifies low-utilization carriers as deficient. In addition, complete and accurate data on all carriers' VMT is not currently available.

c. *Solution*: FMCSA has revised its approach to measure carriers' exposure on the road within the Unsafe Driving BASIC and the Crash Indicator. This new approach uses a combination of PUs and, when available and reliable, VMT data from FMCSA's Motor Carrier Census. Further, the Agency is currently exploring options to enhance the

completeness and accuracy of VMT data, including confirming the validity of the VMT information from other sources.

d. Implementation Approach:

i. Segmentation –The carrier population is segmented into two groups for the Unsafe Driving BASIC and Crash Indicator based on the types of vehicles operated so that companies operating fundamentally different types of vehicles are no longer compared with each other:

1. Segment 1 –"Combo": Combination trucks/motor coach buses constituting 70% or more of the total PUs in a carrier's fleet.
2. Segment 2 –"Straight": Straight trucks/other vehicles constituting more than 30% of the total PUs in a carrier's fleet.

ii. Utilization Factor –Carriers with above-average truck utilization will receive an adjustment to their PUs called the Utilization Factor (UF), which will provide a safety-based adjustment to the Unsafe Driving BASIC and Crash Indicator percentiles. Only carriers with annualized VMT data reported in the past 24 months on the Motor Carrier Census (obtained via the VMT field on the MCS-150 Form or from an FMCSA investigation) will be eligible to receive an adjustment. Carriers without current VMT will not benefit from the utilization factor in their safety assessment calculations.

iii. Safety Event Grouping – The Unsafe Driving BASIC and Crash Indicator will change from using PUs as the basis for safety event grouping (formerly referred to as peer grouping) to using the number of inspections with an Unsafe Driving-related violation for the Unsafe Driving BASIC and the number of crashes for the Crash Indicator. The safety event grouping allows the SMS to handle the diverse motor carrier population while ensuring similarly situated carriers are treated with the same standard.

2. Refinements to the measurement approach for the Controlled Substances/Alcohol BASIC

a. *Feedback Received*: Operational Model test results and law enforcement experts indicated that violations within this BASIC are more likely to be found during an inspection rather than cause an inspection and therefore, measuring exposure in this BASIC by number of PUs does not accurately reflect carrier exposure.

b. *Analysis Conducted*: Analysis confirmed that these types of violations are more likely to result from an inspection than to be the cause of the inspection.

c. *Solution:* The Controlled Substance/Alcohol BASIC measure of exposure will now be based on the number of relevant inspections instead of the number of PUs as in the prior version of the SMS. This BASIC will change from using PUs as the basis for safety event grouping to using number of inspections with a Controlled Substance/Alcohol-related violation.

d. *Implementation Approach*: This measure is now calculated by the following formula:

$$BASIC\ Measure = \frac{number\ of\ time\ and\ severity\ weighted\ applicable\ violations}{total\ time\ weight\ of\ relevant\ inspections}$$

Note: Further information on time and severity weights is available in the SMS Methodology document.

3. **Updates to the severity weights of roadside violations based on subject matter expert review**
   a. *Feedback Received*: Law enforcement personnel recommended that the violation used in the measurement system be updated to reflect the current set of roadside inspection safety violations. Enforcement personnel, along with the motor carrier industry, also suggested that the severity weights assigned to some violations be reassessed.
   b. *Analysis Conducted*: SMEs from FMCSA's field staff, including enforcement personnel and CSA 2010 development team members, examined severity weighting and submitted recommendations for changes to the Agency.
   c. *Solution*: This version of SMS includes updated violations and severity weightings.
   d. *Implementation Approach*: Appendix A in the SMS Methodology contains a complete listing of violations and severity weights.

4. **A more strategic approach to addressing motor carriers with a history of size and weight violations**
   a. *Feedback Received*: Results from the Operational Model test have demonstrated the difficulties of enforcing vehicle size and weight violations through CSA 2010 interventions conducted by FMCSA and State Safety Investigators.
   b. *Analysis Conducted*: Alternative methods to address this safety issue are currently under development. These methods include a more refined collection of detailed size and weight violation data and alerts in systems used by roadside inspectors to identify carriers with patterns of prior size and weight violations.
   c. *Solution:* Size and weight violations have been removed from the Cargo-Related BASIC. However, it is important to note that roadside inspectors will continue to cite these violations at the roadside and Safety Investigators will continue to address these violations, including potential enforcement actions if appropriate, through investigations.